

*Application for*  
**UNITED STATES LETTERS PATENT**

*of*

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*for*

## METHOD AND APPARATUS FOR SELECTION OF ITEMS

Parameter	Value	Unit	Reference
Temperature	25.0	°C	[1]
Pressure	1.0	atm	[1]
Concentration	0.1	mol/L	[1]
Time	10.0	min	[1]
Wavelength	254	nm	[1]
Scan rate	1.0	nm/min	[1]
Resolution	0.5	nm	[1]
Slit width	1.0	mm	[1]
Detector	Photodiode array		[1]
Software	UV-PRO		[1]
Instrument	UV-1601		[1]
Sample	Water		[1]
Blank	Water		[1]
Path length	1.0	cm	[1]
Wavelength range	200-300	nm	[1]
Scan range	200-300	nm	[1]
Resolution	0.5	nm	[1]
Slit width	1.0	mm	[1]
Detector	Photodiode array		[1]
Software	UV-PRO		[1]
Instrument	UV-1601		[1]
Sample	Water		[1]
Blank	Water		[1]
Path length	1.0	cm	[1]
Wavelength range	200-300	nm	[1]
Scan range	200-300	nm	[1]
Resolution	0.5	nm	[1]
Slit width	1.0	mm	[1]
Detector	Photodiode array		[1]
Software	UV-PRO		[1]
Instrument	UV-1601		[1]
Sample	Water		[1]
Blank	Water		[1]
Path length	1.0	cm	[1]
Wavelength range	200-300	nm	[1]
Scan range	200-300	nm	[1]
Resolution	0.5	nm	[1]
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Software	UV-PRO		[1]
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Detector	Photodiode array		[1]
Software	UV-PRO		[1]
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Resolution	0.5	nm	[1]
Slit width	1.0	mm	[1]
Detector	Photodiode array		[1]
Software	UV-PRO		[1]
Instrument	UV-1601		[1]
Sample	Water		[1]
Blank	Water		[1]
Path length	1.0	cm	[1]
Wavelength range	200-300	nm	[1]
Scan range	200-300	nm	[1]
Resolution	0.5	nm	[1]
Slit width	1.0	mm	[1]

## Method and Apparatus for Selection of Items

The invention relates to a method and apparatus for selection of items. More particularly, specific  
5 embodiments of the invention relate to a method and apparatus for selecting pictures to print from a "digital film".

By digital film, it is meant storage media utilised by  
10 digital cameras, such media comprising Smart Media, Compact Flash or other types of solid-state storage card.

Currently, the selection of which pictures to print from such a digital film involves relatively awkward mechanisms  
15 to identify a sub-set of prints which the user desires. Typically, when deciding which photographs to print out from a digital camera, either some mechanism in the original camera has to be used (commonly involving the use of very small and fiddly buttons), whereas digital film  
20 enabled printers (i.e. printers having a dedicated interface for receiving digital films and enabling printouts) do enable stand alone printer configurations, but also tend to have rather clumsy user interfaces for individual selection of photographs, again using fiddly  
25 buttons.

Current solutions within the original camera rely on a DPOF (direct print order format) mechanism. For digital films made on cameras without such a facility, the  
30 standard approach is to print a "contact sheet" of all pictures on the film as a series of thumbnail pictures and then have the user select, on a limited front panel on the printer, the numbers (and number of copies, sizes etc.) of

the prints required. Typically the user has to closely correlate print choices from the contact sheet with the state of a small display on the printer.

- 5 As can be appreciated, the reading off of numbers relating to pictures on a contact sheet and then inputting numbers and information relating to how to print out those choices, and in what number, is a tedious, non-intuitive process.

10

It is an aim of preferred embodiments of the present invention to provide a method and apparatus for easing the selection of items and their format for printing. More specifically, it is an aim of the present invention to  
15 ease the selection of prints from a digital film.

20

According to a first aspect of the present invention there is provided a method for selecting prints of photographs from a digital film media, the method comprising: (i) printing a selection sheet of thumbnail representations of photographs available on the media to be printed, the selection sheet further comprising a plurality of selection fields, each thumbnail representation being associated with at least one selection field; (ii) marking  
25 one or more of said selection fields according to a user choice of photograph(s) to be printed; (iii) inspecting the selection sheet to determine which of said selection fields has been marked in step (ii); and (iv) performing one or more actions relating to the photographs stored on  
30 said digital media, in accordance with said marked selection fields.

Preferably, for each thumbnail representation a corresponding plurality of selection fields are provided.

Preferably, step (iv) is a printing step and a first type  
5 of said corresponding plurality of selection fields designates a print format in which the photograph represented by said thumbnail representation is to be printed in step (iv).

10 Preferably, step (iv) is a printing step and a second type of said corresponding plurality of selection fields designates a number of prints of photographs corresponding to a particular thumbnail representation to be printed in step (iv). There may be provided n print number selection  
15 fields associated with each thumbnail representation, wherein the number of prints of a particular photograph determined to be printed corresponds to the total number of such n print number selection fields marked by the user.

20 A third type of said corresponding plurality of selection fields may be a "deletion" field which, when marked, designates that a particular photograph corresponding to the marked deletion field is to be deleted from the  
25 digital film media in step (iv).

Preferably, said selection sheet is also provided with an identifier which is unique to the digital film media and, wherein, in step (iii) said unique identifier is inspected  
30 in a preliminary step and, if the unique identifier does not correspond to a unique identifier allocated to the digital film media, then the method terminates.

The unique identifier may comprise a bar code.

Preferably, step (iv) is a printing step and in step (ii) a user fills in one or more of the selection fields according to user choice of photograph to be printed, user choice of number of prints of said photographs to be printed and user choice of format of said photograph to be printed.

10 Preferably, marking of said selection fields in step (ii) comprises filling in said selection field so as to change said selection field from a light, unselected, condition to a dark, selected, condition.

15 In said step (iii) the marked selection sheet may be scanned.

Preferably, in said step (iii) only those parts of the selection sheet corresponding to selection fields are inspected and the information gleaned from the inspection is processed to determine whether said selection fields are marked or unmarked.

The method may be implemented by means of a printer including a scanning mechanism in a feed path of the printer, wherein in step (i) the selection sheet is printed on the basis of data input directly to the printer by means of a digital film media interface, the printer being arranged to print out said selection sheet which is thereafter, in step (ii), manually marked by a user according to the user choice, the mark selection sheet then being input to the printer feed path and scanned by the scanning mechanism so as to perform the inspecting

step (iii), data obtained during the inspecting step then being used so as to enable the printing in step (iv) of said one or more photographs.

- 5 According to another aspect of the invention, there is provided a digital film enabled printer, said printer including printing means, a first interface for interfacing with a digital film media and for reading data from said digital film media, a user interface for  
10 receiving commands from a user, inspection means located in a paper feed path of the printer, processing means for processing data from said digital film media and user commands from said user interface, the processing means being arranged to create and to print out, using the  
15 printing means, a selection sheet of thumbnail representations for photographs available on the media to be printed, wherein said selection sheet further comprises a plurality of selection fields, each of said thumbnail representation being associated with at least one of said  
20 selection fields, the processing means being further arranged for processing data from said inspection means so as to enable a user marked selection sheet input to the printer via the printer feed path to be inspected and a determination to be made as to which, if any, selection  
25 fields have been marked by the user and to enable the performance of one or more actions relating to the photographs stored on the digital film media in accordance with the marked selection fields.
- 30 Said actions preferably comprise the printing of one or more photographs from the media in accordance with the marked selection fields.

Said actions may include the deletion of one or more photographs from the media in accordance with marked "deletion" selection fields.

- 5 Said inspection means preferably comprises a scanning mechanism such as a scanner attached to a print head of the printing means and arranged for transverse movement with said print head across the feed path in response to signals from the processing means.

10

Said inspection means may alternatively comprise a plurality of photosensitive means disposed in the printer feed path in alignment with positions corresponding to said selection fields.

15

Preferably, for each thumbnail representation printed a corresponding plurality of selection fields are printed.

- 20 Preferably, a first of said corresponding plurality of selection fields designates an available print format in which the photograph represented by said thumbnail representation is capable of being printed.

- 25 Preferably, one or more of said corresponding selection fields designate available numbers of prints of photographs corresponding to a particular thumbnail representation.

- 30 There may be provided n print number selection fields associated with each thumbnail representation, wherein the number of prints of a particular photograph determined by the processing means to be printed corresponds to the total number of such n print number selection fields

revealed by the inspection means as being marked by the user.

Preferably, said printer is also provided with a reader  
5 for reading from a marked selection sheet a unique sheet  
identifier which corresponds to a unique identifier of the  
digital film media and, the processing means being  
arranged so that if the unique sheet identifier does not  
correspond to the unique identifier of the digital film  
10 media, then the output of prints of photographs is  
disabled.

Said processing means may be further arranged to read a  
unique identifier from the digital film media via the  
15 first interface and to create and print out, using the  
printing means, a unique sheet identifier on said  
selection sheet.

Said unique sheet identifier may comprise a bar code and  
20 said reader comprise a bar code processing capability in  
the scanning mechanism. Alternatively said reader may  
comprise a dedicated bar code reader.

For a better understanding of the invention, and to show  
25 how embodiments of the same may be carried into effect,  
reference will now be made, by way of example, to the  
accompanying diagrammatic drawings in which:

Figure 1 shows an example of a selection sheet printable  
30 by a digital film enabled printer in accordance with an  
embodiment of the present invention;

Figure 2 shows the selection sheet of Figure 1, on which user selections of print numbers and formats have been made;

- 5 Figure 3 is a flow diagram illustrating user selection steps involved in selecting numbers and formats of prints;

Figure 4 shows an example in schematic block form of a printer according to the preferred embodiment of  
10 invention; and

Figure 5 is a view along the printer feed path of a printer similar to the Figure 4 embodiment but incorporating a low-cost inspection means.  
15

As mentioned previously, the printing out of a contact sheet showing thumbnails of available photographs from the digital film and then using a keyboard on the printer to input print selections is a very counter intuitive means  
20 (and therefore time consuming) of making selections of individual photographs for printout.

Embodiments of the present invention, rather than printing out a contact sheet from a digital film enabled printer,  
25 instead provide for the printing out of a selection sheet 10.

An embodiment of such a selection sheet 10 is shown in Figure 1. From Figure 1, it will be appreciated that  
30 thumbnail photographs 11 to 16 (similar to those printed out in the prior art) are provided, but each of those thumbnail representations is also provided with a plurality of user markable selection fields. For

instance, underneath thumbnail 11, there are shown a first type of selection field comprising boxes 21<sub>11</sub> - 23<sub>11</sub> relating to a number of copies of that print which it might be desired to obtain, a second type of selection field comprising selection boxes 31<sub>11</sub>, 32<sub>11</sub> relating to alternative print sizes (formats) and a third type of selection field comprising selection box 41<sub>11</sub> relating to whether or not to delete a particular photograph from the digital film media. The selection sheet is also provided with a unique sheet identifier comprising a bar code 40 corresponding to a unique identifier of the particular digital film.

Referring now to the flow chart of Figure 3, it will be explained how the selection sheet of Figure 1 may be utilised to enable the printout of selected prints, selected numbers of such prints and selected formats of the prints in a user friendly fashion.

In step 1 of Figure 3, a user loads a digital film media to a printer and selects a "print sheet" function. Typically, this may involve the insertion of a smart card bearing the photographic images into an appropriate input port on a stand-alone digital film enabled printer and entering a simple command via a user interface. Alternatively, this step may comprise the sub-steps of reading the digital film into, for instance, a PC port or other input facility.

In step 2 of Figure 3, the printer (be it the stand-alone printer or a printer connected to an appropriate output port of a PC) is arranged to print out a selection sheet of the type shown in Figure 1, the selection sheet

including thumbnail representations of the various selectable prints and further including the selection fields and bar code described in relation to Figure 1.

5 In step 3, a user takes the printed out selection sheet and fills in the selection fields according to that user's choice. For instance, referring to Figure 2, it can be seen that for thumbnail 12, the user has selected one copy in 4x6 format, for thumbnail 13 the user has selected two  
10 copies in 5x8 format, for thumbnail 14 the user has selected two copies in 4x6 format and for thumbnail 15 the user has selected one copy in 5x8 format. The user has made no selections of thumbnails 11 or 16. The selection fields are provided with appropriate intuitive  
15 alphanumeric identifiers (i.e. in this case "copies", "4x6" and "5x8") so that the operation is particularly simplified.

In step 4, the user then inputs the marked-up selection  
20 sheet to the input feed of the printer and via a user interface sets the printer to read the marked sheet. In step 5, an inspection mechanism provided in the printer inspects (for instance scans) the marked selection sheet, including all of the information relating to copies,  
25 format and the bar code information relating to the digital film itself. In step 6, a comparison is made between the unique sheet identifier (bar code) on the marked selection sheet and the unique identifier of the digital film which is currently loaded to ensure that they  
30 correspond. If there is no correspondence, then further operations are aborted in step 7. However, if there is correspondence between bar code and the loaded digital film then the information from the marked selection sheet

is regarded as valid, the marked selection sheet is returned to the user and the printer then automatically proceeds to process and interpret the scanned data and to print out the appropriate number of copies of user  
 5 selected prints in the appropriate formats in step 8.

If the scanned data shows that one or more of the "deletion" boxes 41<sub>11</sub> etc. have been marked then the processing means of the printer is instructed to delete  
 10 the corresponding photographs from the digital film media.

If the user retains the marked selection sheet then the user may, in the future, use that selection sheet again by reloading the digital film into its interface and directly  
 15 selecting read to scan the marked sheet. In such a case this shortened procedure would start at step 4 above.

It will be readily appreciated that because the method provides a way in which information related to selected  
 20 photographs are to be handled, that information need not necessarily be confined to formats and numbers of prints of photographs to be output. For instance, they could also be provided a selection field which, when marked, authorises deletion of a particular photograph from the  
 25 digital film media. In this way, the information on the sheet may also be used if desired to actually control what is stored on the digital film media and how that is stored.

30 As will be appreciated from the above discussion in relation to Figures 1 to 3, embodiments of the invention require that the digital film enabled printer include some

means for reading off information from the marked selection sheet.

Referring now to Figure 4, there is shown a schematic representation of a digital film enabled printer 40. The printer has a first interface 41 for interfacing with a digital film media 42 and for reading data from the digital film media 42, a user interface 43 for receiving commands from a user, an input/output printer feed path 44 comprising an input tray 44A and path 44B with feed roller 44C, processing means 47, print means comprising a print head 48, and inspection means comprising a scanning mechanism 45 arranged for transverse movement across the feed path 44 and being located on the print head 48 for providing the transverse movement.

It will be appreciated that in the digital film enabled printer 40, a user may initiate the printing out of a selection sheet 10 from data of the digital film media 42 from the first interface 41 as a routine operation via the user interface 43. The selection sheet has a known format imposed upon it by the processing means 47 and the printing means. Therefore, when the marked selection sheet is fed back into the printer using the printer feed path 44, the print head 48 is caused to move back and forth across the feed path and the marked selection sheet is scanned by the scanning mechanism 45, it is a simple and routine matter to provide appropriate software which will enable the processing means 47 to automatically "know" what parts of the data from the scanning mechanism 45 will carry valid data (i.e. correspond to the expected position of a selection field or the bar code) and therefore which particular positions on the selection

sheet require inspection. This foreknowledge of expected valid data positions is available because the speed of the print feed for the given printer is known and, therefore, the time at which the individual selection fields bearing the relevant information will pass beneath the scanning mechanism on the print head 48 is predictable.

Because the inspection operation which needs to be carried out to check whether particular selection fields have been filled in is relatively simple, the scanning mechanism need not be particularly sophisticated (and therefore may be of low cost).

In a less preferred alternative to providing a scanning mechanism 45 associated with the print head 48 a static scanning bar could be provided suspended across the feed bath. A dedicated bar code reader could be provided for reading the bar code of the sheet.

As a further alternative to incorporating a scanner in the feed path of the printer, a less sophisticated mechanism for inspection, as shown in Figure 5 may be employed. Figure 5 is an end-on view showing the entry slot of a printer feed path (feed tray removed for clarity). In the Figure 5 embodiment photodiodes  $51_1-51_N$  (or similar light sensitive means) are positioned across the feed path 44 at positions corresponding to the various selection fields and outputs from such photodiodes  $51_1-51_N$  are read only during valid periods as in the discussion above. In other words, a valid period is set to be a period in which a filled/unfilled selection field is expected to pass in front of a given photodiode and in which the output of a simple light or dark signal from that photodiode will

therefore convey meaningful information. In such a dedicated printer, the other elements as discussed in relation to Figure 4 above (with the exception of the scanning mechanism 45) are also provided and there may  
5 further be provided a dedicated bar code reader for reading the sheet identifier.

It will also be appreciated that, in a less preferred embodiment, the inventive selection process may also be  
10 employed using a conventional PC, scanner and printer, with appropriate scanning software being provided to operate the scanner and analyse the scanned results in the PC.

15 It is noted that combined printers with scanners are known, for instance, from US 5,767,988, US 5,532,825 and US 5,833,381 all of which are assigned to Hewlett-Packard Company.

20 From the aforementioned description, it will be appreciated that embodiments of the present invention provide a user-friendly means by which prints from a digital film media may be selected for output in appropriate numbers and formats.

25 Many variations may be made to the apparatus and methods of the present invention whilst still remaining within the scope of the invention. The scope of the invention is limited only by the scope of the appended claims.